

3rd NATIONAL ICTs in BASIC EDUCATION CONGRESS

Authentic technology- supported learning activities



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Any sufficiently advanced technology is indistinguishable from magic

Arthur C Clarke





John Sculley

Chief Executive of Apple Computer in 1988

“

Teachers and students will command a rich learning environment that, had you described it to me when I was at school, would have seemed entirely magical ...

John Sculley

Chief Executive of Apple Computer in 1988



... Imagine a screen that can display in vivid colour the inner workings of a cell, the births and deaths of stars, the clashes of armies, and the triumphs of art.

John Sculley

Chief Executive of Apple Computer in 1988

... And then imagine that you have access to all of this and more by exerting little more effort than simply asking for it to appear. It seems like magic, even today!"



Not just magic!

Reflects a
pedagogical
view of
learning **from**
computers



Learning WITH technology

We can use pedagogical models (such as **authentic learning**) to guide the creation of successful learning environments



Authentic learning

What is it?
What is it not?



9 elements of authentic learning



(Herrington &
Oliver, 2000)

- Authentic context
- Authentic activity
- Expert performances
- Multiple perspectives
- Collaboration
- Reflection
- Articulation
- Coaching and scaffolding
- Authentic assessment

Authentic context

Authentic context

Authentic task

Expert performance

Multiple views

Collaboration

Articulation

Reflection

Scaffolding

Authentic assessment

A physical or virtual environment that reflects the way the knowledge will be used in real-life

Authentic context

- The context needs to provide the purpose and motivation for learning
- Ideas can be explored at length
- A design to preserve the complexity of the real-life setting
- Not sufficient to simply provide suitable examples from real-world situations to illustrate the concept or issue being taught



Authentic context

Technology tool

Web resources
(and excursion)

Target students

Year 10

Subject area

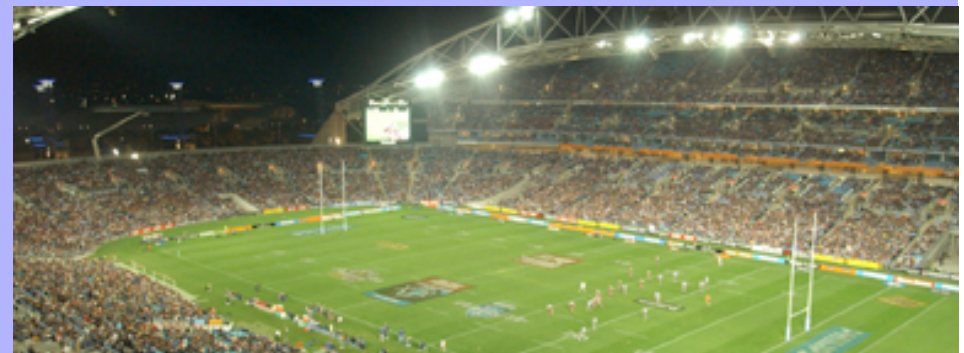
Geography:
Research action
plan

The screenshot displays the 'Geography Challenge' website. At the top, there's a header with 'Group: Kangaroos | User: Whole Group | Log out'. Below this is a navigation bar with tabs for 'Introduction', '1', '2', '3', '4', '5', '6', '7', and '8'. The main content area is titled 'Step 1' and 'Understanding the problem'. It contains text explaining the complexity of the problem and the role of stakeholders. A sidebar on the right lists various tasks and resources, including 'What is a wetland?', 'Mapping', 'Climate', 'Flora and fauna', 'History', 'Stakeholder roles', and 'Geographic Information System - an overview'. The interface is designed to guide students through a research action plan.

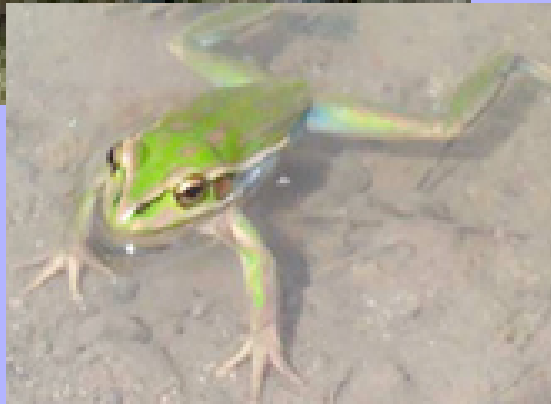
Sydney Olympic Park



- Best known as site of 2000 Olympics
- Sporting venue



Biodiversity and resource conservation



- Endangered species
- Sustainability
- Conservation of energy

Context for data collection

Geography Challenge

Sydney Olympic Park Authority
7 Figtree Drive
Sydney Olympic Park,
NSW, 2127

Dear Consultants,

The Sydney Olympic Park Authority wish to commission you to conduct an in-depth investigation into land and water management at the Park. We have received a number of complaints from visitors and nearby residents about increasing numbers of mosquitoes in the area, rats and feral cats in the parklands and smelly ponds that are unpleasant to be near.

We are now concerned that something might be affecting the wetlands area and causing a serious imbalance in the land and water environment.

As expert geographers, you and your colleagues are best placed to determine the nature of the investigation. However, some of the issues and questions that concern us are:

- **Human interaction:** What impact are humans having on the Park? Are they contributing to the presence of introduced pests? What effect do they have on the native animals in the parklands and the ecology generally? What effect do they have on the endangered species that live in the park?
- **Water:** What is the ideal water quality in the park? Should we prioritise water for the few endangered species we have in the park, or for all users of the park, including human visitors? Can we satisfy the needs of all groups?
- **Pests:** Are there more mosquitoes breeding in the wetlands than normal? Is the situation within a normal range of variation, or is this an unusual and potentially harmful situation? Are the residents' complaints justified? What other pests have impacted on the ecology of the park? Are introduced weeds threatening native vegetation in the park?

We are commissioning you to investigate these issues, focusing specifically on pests, water and human interaction. We request from you your expert opinion of the health and future of the wetlands, and your recommendations on how land and water management should proceed.

Yours sincerely,



Setting the
context
Animation

Authentic tasks

Authentic context

Authentic tasks

Expert performance

Multiple views

Collaboration

Articulation

Reflection

Scaffolding

Authentic assessment

Tasks and activities
that have real-world
relevance

Authentic tasks

- Design activities that have clear goals and real-world relevance
- Activities which require production of knowledge rather than reproduction
- Activities which are complex and ill-defined
- Completed over a longer period



Authentic tasks

Technology tool

Online discussion
forums/email

Target students

Upper high
school

Subject area

Italian language



University of Wollongong
Faculty of Education

Discussion Space

Benvenuti al forum di classe.

Tramite questo forum potete inviare messaggi a tutti gli studenti dei corsi di italiano del secondo e terzo anno, all'insegnante e ai facilitatori italiani presenti nel gruppo.

Vi invito ad usare questo forum per discutere i vostri dubbi, scambiare idee e suggerimenti sul vostro lavoro di gruppo e per aggiornare gli altri componenti della vostra classe virtuale sui progressi delle vostre attività.

Forum :ITAL252/352-Open Discussion

- Oh dear - Cara Walkam - Tue, 29 Aug 2006, 14:48
- Ciao - Cara Walkam - Tue, 29 Aug 2006, 14:39

Mi dispiace per non postare.

Devo domandare che non mi domandate questioni difficile mercoledì.

Grazie :)

- Introduzione Julian -piu' Hip Hop SPegazione =) - Julian Lenzo - Wed, 23 Aug 2006, 12:23
- victoria - Rebecca Di Ciaccio - Mon, 21 Aug 2006, 17:53
- Victoria - itinerario - Lissa Giurissevich - Mon, 21 Aug 2006, 16:34
- itinerario per NSW - Jessica D'Amico - Mon, 21 Aug 2006, 16:10
- Itinerario NT - Sophie Hull - Thu, 17 Aug 2006, 09:15
- Dall'Italia con furore! - Samantha Mavuli - Mon, 14 Aug 2006, 18:26
- ciao! - Alissia Sbrizzi - Tue, 8 Aug 2006, 22:54

Ciao a tutti!
Mi chiamo Alissia e ho diciotto anni. Vivo a Sydney ma vado all'universita a Wollongong tre volte alla settimana. Ho studiato l'italiano adesso per quattro anni e mi ha dato l'opportunita di comunicare con i miei parenti che non conoscono bene l'inglese. Studio una doppia laurea-l'arte e giurisprudenza e vorrei visitare e studiare in Italia l'anno prossimo.

Authentic tasks



Plan a 5 day trip to Italy

- Students use discussion forums to converse in Italian with students in a school in Italy
- Enquire about:
 - sights to see,
 - food,
 - transport,
 - currency,
 - customs and lifestyle
- Create itinerary

Expert performance

Authentic context

Authentic task

Expert performance

Multiple views

Collaboration

Articulation

Reflection

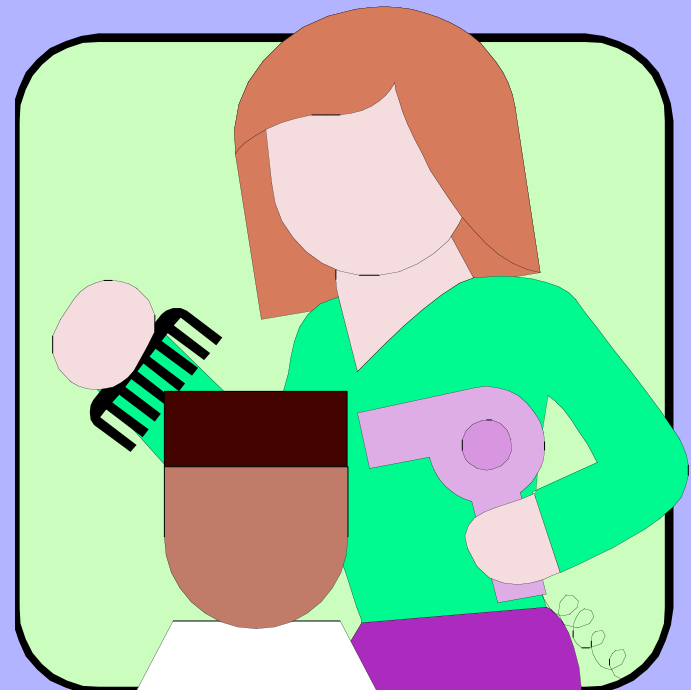
Scaffolding

Authentic assessment

Access to expert thinking and the modelling of processes

Expert performances

- Access to the way an expert would think and act
- Access to learners in various levels of expertise
- Opportunities for the sharing of narratives and stories



Expert performance

Technology tool

Podcasts and vodcasts

Target students

Upper high school

Subject area

Business studies



Expert performance



Business managers and leaders as guest speakers (e.g., time management)

Talks can be recorded and podcast

Follow up discussion on forum

Multiple perspectives

Authentic context

Authentic task

Expert performance

Multiple perspectives

Collaboration

Articulation

Reflection

Scaffolding

Authentic assessment

Different perspectives
from different points of
view

Multiple perspectives

- Not just a single perspective - such as a textbook
- Sufficiently rich learning environment to sustain repeated examination
- Different points of view



Multiple perspectives

Technology tool

Digital libraries

Target students

Upper
elementary

Subject area

Science: The
planets

Planning for my investigation...

What are my questions? What do I want to find out about?



How will I find out?

Talk to someone



Read a printed book



Research on the
Internet



Visit a location



Watch
TV/Video/DVD



Other ...

Multiple perspectives

DLESE Educational Resources For Educators News & Opportunities People & Groups For Developers About DLESE Register with DLESE

Digital Library for Earth System Education Funded by the National Science Foundation

Getting started with DLESE

people on mars

Educational resources

- [Browse resources & collections](#)
- [Grade Level](#)
- [Resource Type](#)
- [Collections](#)
- [Standards](#)
- [Search](#)

What's new at DLESE

- [Making a Broader Impact: Geoscience Education, Public Outreach & Criterion 2 - report available](#)
- [DLESE Newsletters](#)
- [New resources & reviews](#)

Resource of interest << Previous | Next >>

Stellarium

Recent debate over the status of Pluto as a planet, (or not as it was [decided by the International Astronomical Union](#)) has turned many eyes to the sky this month. Extend this scientific news event by bringing the stars and planets into the classroom using [Stellarium](#); free software that renders realistic views of the sky in real time and in 3D. Users can depict the sky at their own locations, at various times, and show grids, constellation names, and constellation art. An interactive feature allows users to click on an object and access information about it in a pop-up window. It is like a planetarium for your computer. [Download and install](#) to Mac or PC (25MB). The [Open Astronomy Curricula](#) offers lessons for projector systems, including those that use Stellarium, but the software can also be used directly from your school computer.

[Suggest](#) an interesting Earth system site.
[View or subscribe](#) to all resources of interest

A free service for learners of all ages

[FAQ](#) | [Site map](#) | [Privacy](#) | [Terms of use](#) | [Contact us](#)

NSDL

Could humans live on Mars?

Digital libraries provide collections of hundreds of valuable online resources

More useful for education than a simple Google search

Multiple perspectives

DLESE
Digital Library for Earth System Education
Funded by the National Science Foundation

What's new at DLESE

- Making a Broader Impact: Geoscience Education, Public Outreach & Criterion 2 - report available
- DLESE Newsletter
- New resources & reviews

Resource of interest << Previous | Next >>

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DLESE Find a Resource > "People on Mars" > Gra...a, Starting Point, Stone Wall, VisionLearning

UOW EDU Intra Goog GoogSchol RIS Search Maps Phone Research Uni Work

DLESE Find a Resource > "P..."

DLESE

Find a Resource

People on Mars

Educational resources Search

Grade Level Resource Type Collections Standards Clear selections

Your selections: Grades: 6-8 + Resource type: Audio (all) + Collections: All

Educational resources > Find a resource

Results 1 - 10 of 11 for 'People on Mars' 1 2 >>

Can People Go to Mars?

http://science.nasa.gov/headlines/y2004/17feb_radiation.htm?list655833

Submit a comment or teaching tip

This article presents information about the radiation hazards facing astronauts who travel to Mars. It covers the types of radiation including the most dangerous, galactic cosmic rays (GCRs), the damage it does to the body, and methods of shielding against it. One can also listen to this story via streaming audio or a downloadable file. [Full description.](#)

Grade level: Intermediate (3-5), Middle (6-8), High (9-12)

Resource Type: Webcast - audio

Subject: Space science

CHOOSING & USING this resource...

Membranes on Mars

http://science.nasa.gov/headlines/y2003/03dec_membranes.htm

Submit a comment or teaching tip

This article describes thin membranes that could help people go to Mars and clean the air here on Earth. Since different molecules move through membranes at different rates, membranes can be used to sort things out, separating one type of molecule from another. In this case the molecule is carbon dioxide, which if pure can be used to make methane and water on Mars. The membrane could also be used ... [Full description.](#)

Grade level: Middle (6-8), High (9-12)

Resource Type: Ref. material, Webcast - audio

Subject: Environmental science, Space science, Technology

CHOOSING & USING this resource...

Mars Mice

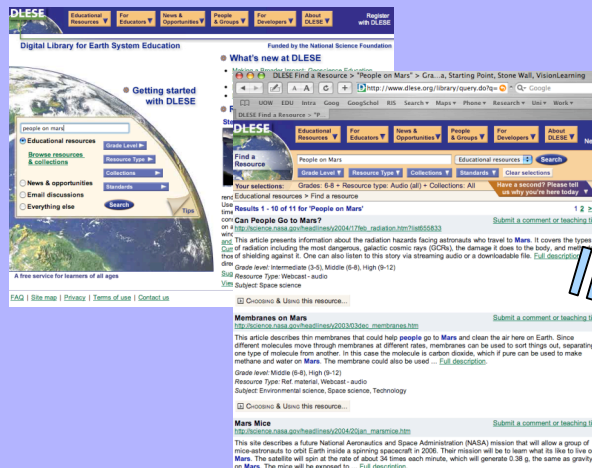
http://science.nasa.gov/headlines/y2004/20jan_marsmice.htm

Submit a comment or teaching tip

This site describes a future National Aeronautics and Space Administration (NASA) mission that will allow a group of mice-astronauts to orbit Earth inside a spinning spacecraft in 2006. Their mission will be to learn what its like to live on Mars. The satellite will spin at the rate of about 34 times each minute, which will generate 0.38 g, the same as gravity on Mars. The mice will be exposed to ... [Full description.](#)

Multiple perspectives

Digital library: Story



Can People Go to Mars?



Space radiation between Earth and Mars poses a hazard to astronauts. How dangerous is it out there? NASA scientists are working to find out.

Listen to this story via [streaming audio](#), a [downloadable file](#), or [get help](#).

February 17, 2004: NASA has a mystery to solve: Can people go to Mars, or not?

"It's a question of radiation," says Frank Cucinotta of NASA's Space Radiation Health Project at the Johnson Space Center. "We know how much radiation is out there, waiting for us between Earth and Mars, but we're not sure how the human body is going to react to it."

NASA astronauts have been in space, off and on, for 45 years. Except for a few quick trips to the moon, though, they've never spent much time far from Earth. Deep space is filled with protons from solar flares, gamma rays from newborn black holes, and cosmic rays from exploding stars. A long voyage to Mars, with no big planet nearby to block or deflect that radiation, is going to be a new adventure.

Right: "Distant Shores." NASA artwork by Pat Rawlings/SAIC. [\[Larger image\]](#)

NASA weighs radiation danger in units of cancer risk. A healthy 40-year-old non-smoking American male stands a (whopping) 20% chance of eventually dying from cancer. That's if he stays on Earth. If he travels to Mars, the risk goes up.

The question is, how much?

"We're not sure," says Cucinotta. According to a 2001 study of people exposed to large doses of



Collaboration

Authentic context

Authentic task

Expert performance

Multiple views

Collaboration

Articulation

Reflection

Scaffolding

Authentic assessment

Joint problem
solving and social
support

Collaboration

- Teams or pairs rather than individuals
- Collaboration encouraged through technology (discussion, chats, debates, wikis)
- Tasks addressed to groups, not individuals



Collaboration

Technology tool

Presentation
software,
podcasts

Target students

Upper
elementary

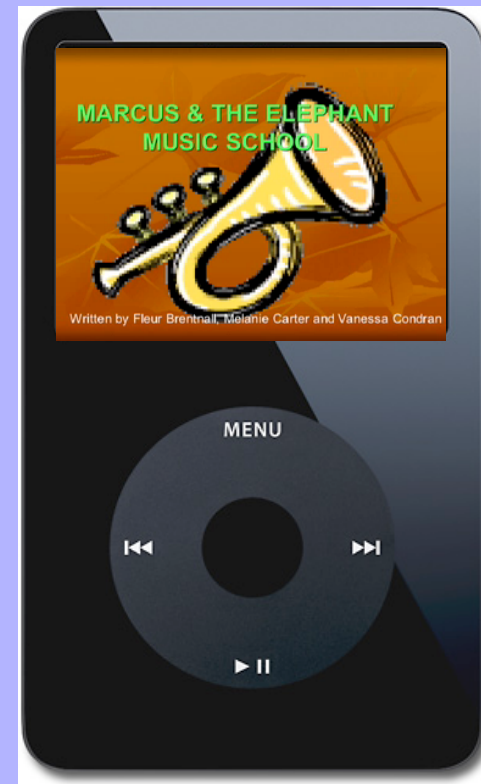
Subject area

Writing



Create a talking book

- Students work in pairs or small groups
- Create a story for younger students
- Take photographs, draw and scan pictures to illustrate their book, create animations,
- Record audio for the story voiceover



Articulation

Authentic context

Authentic task

Expert performance

Multiple views

Collaboration

Articulation

Reflection

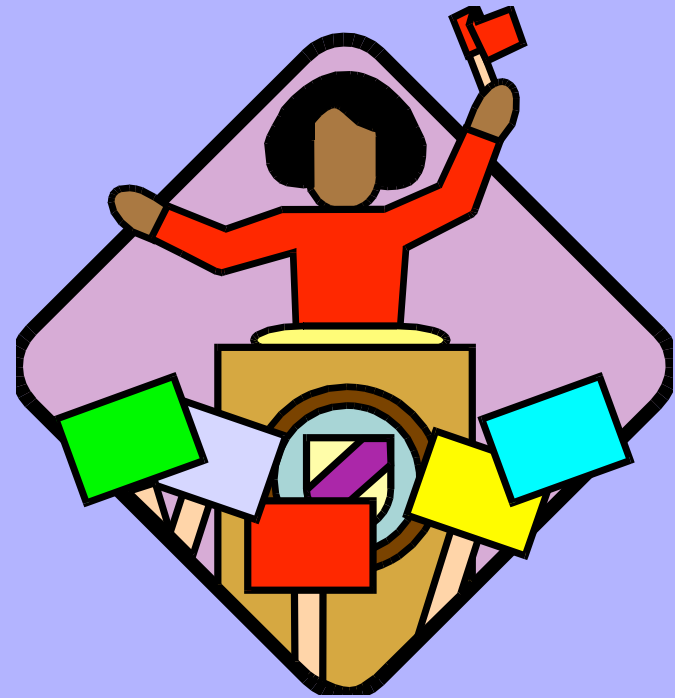
Scaffolding

Authentic assessment

Opportunities for
students to speak
about their growing
understanding

Articulation

- Problems that need to be discussed
- Presentations to class
- Public presentation of argument to enable defence of position and ideas



Articulation

Technology tool

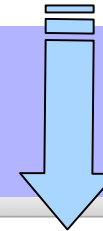
Digital video camera
and iMovie

Target students

Lower high
school

Subject area

Science/
Geography



The role of articulation

- ‘Thought undergoes many changes as it turns into speech. It does not merely find expression in speech; it finds reality and form’
(Vygotsky)



Articulation



- What causes the phases of the moon?
- What causes the seasons?
- What is evaporation?
- How do you read a weather map?

Students create a film to teach other students a scientific concept, including:

- Diagrams
- Interviews
- Music,
- Animations etc.

In order to explain it to others they must understand it and be able to articulate the concepts

Reflection

Authentic context

Authentic task

Expert performance

Multiple views

Collaboration

Articulation

Reflection

Scaffolding

Authentic assessment

Opportunity to think
about, reflect and
make choices

Reflection *in* action

- The facility for students to move around their learning environment and to act upon reflection
- Not quiet and solitary - can be a two-way process
- Non-linear organisation of learning environment
- Opportunities to make choices



Reflection *on* action

Technology tool

Blog site or
word
processing

Target students

All

Subject area

Multi-disciplinary

The screenshot shows a computer interface with a Microsoft Word window titled 'Document2' in the background. In the foreground, a web browser displays 'Bec's Blog'. The blog post is dated 'August 24, 2005' and titled 'Quality Teaching Part 1'. The text discusses the author's reflections on quality teaching, mentioning a dream about principals waving whitebeards and a workshop experience. The blog also includes a section for 'Week 1' and a list of avatars. A large blue arrow points from the text 'Multi-disciplinary' to the blog content.

Word File Edit View Insert Format Font Tools Table Window Work Help

STANDING BY Input Volume Size: 0 KB

Document2

Title

Bec's Blog

« First Year Out Reporting: Trial by Fire | Main | Classroom »

August 24, 2005

Quality Teaching Part 1

Quality teaching. What is it? "I sure as hell wish I knew", calls a voice from the back of my mind.

I went to sleep one night and dreamt about quality teaching. I saw countless summertimes, royal blue, black and white, dunes, documents dance across the backs of hours, with principals waving whitebeards were kept awake by a growing feeling of glory, and re-lived the thrill of the teacher's grasp. When I woke up, I dreamed. I knew that there was something munched through a huge spoonful of single, sorry, school age child. Not a

EDGI 918
Task 1
Reflective Journal

Monique Brown
2813695

Week 1:

The start of a new semester or academic year brings a high level of interest and motivation. I always look forward to the first on campus session to receive the course outline, assignments and to see if there are any familiar faces studying with me. It is always a relief if there is someone that I already know, as it just makes it easier and takes the anxious feeling of "what will I do if I don't understand the subject". Talking to peers one on one either in person or on the phone always helps to clarify content.

Going through the assignments for the first time and talking about them always gives me a tonne of ideas and thoughts on how I will tackle them. I always get excited and highly motivated. Unfortunately the motivation levels drop over the course of time as I realise how much there is to do. Study coupled with work always leaves me feeling very exhausted.

So, we turned up on day 1 and in truth I was happy to be back after the summer break and looking forward to the interactions that were about to take place. Luckily I'd had a sneak preview of the course outline and so was somewhat familiar with the content of the course and up and coming assignments.

Assignment 1 had two choices and I thought that option two would be the better option. When we discussed the assignment in class, I thought that I could put a different spin on it and look at it from the viewpoint of some of my students. I thought about choosing three students from my class and using them as a case study. I thought about giving them something completely different to learn and study the strategies that they used whilst attempting to master the new skill. I even thought about filming them to help analyse their learning strategies and to support my theories. I was

Sec 1 Page 1/1 Show Section Tab Titles

Scaffolding and coaching

Authentic context

Authentic task

Expert performance

Multiple views

Collaboration

Articulation

Reflection

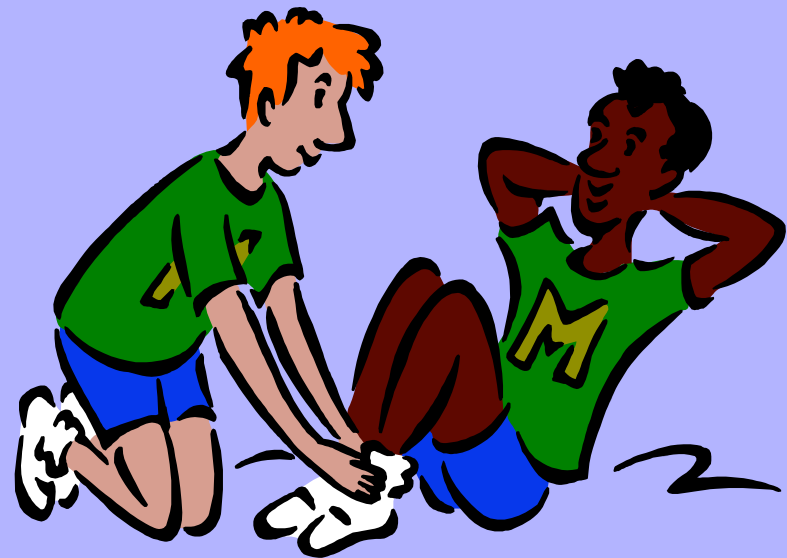
Scaffolding

Authentic assessment

Support provided to the learner by the teacher and others in the learning environment

Coaching and scaffolding

- No attempt to 'transmit' knowledge
- Teacher's role is supporting rather than didactic
- Collaboration where more able partners can assist



Scaffolding

Technology tool

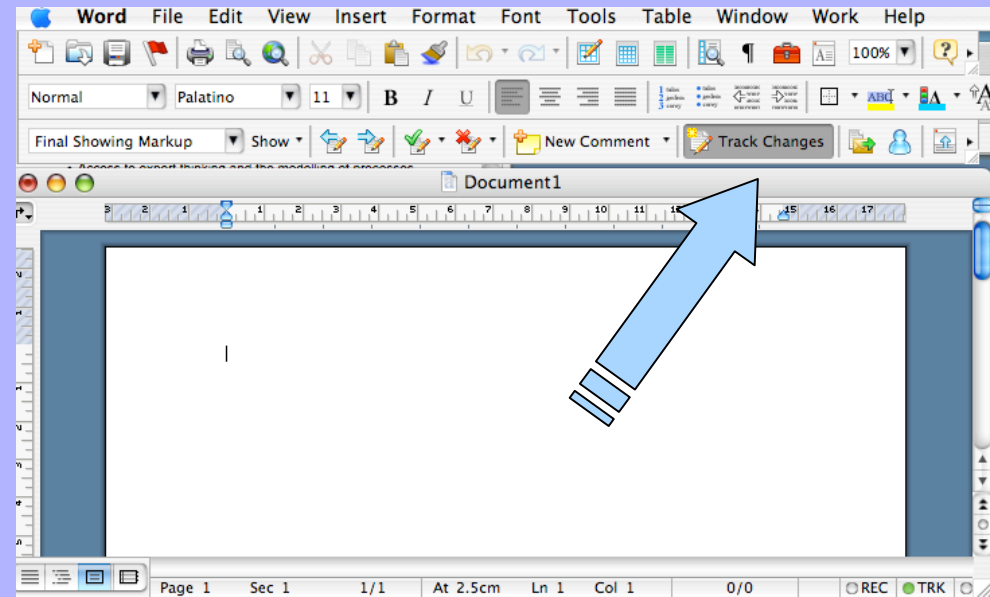
Tracking mode in
Microsoft Word

Target students

Lower
elementary

Subject area

Writing



Scaffolding

our fun day

when yesterday we went to the pool. First
we walked from our school to the pool.
next we changed into our swimmers and had
a swim. after that we had some lunsh and
had aanother swim. finaly we got changed
into our school clothes a walked backe to
school. Then we whent home. it was a vere
good day.

Student
writing
sample

Scaffolding

Dear Casey,

Thankyou for sharing your writing with me. I have made some suggestions for you to think about.

our fun day

This is a great title! Usually when we write a title we put a capital letter at the beginning of each word to tell the reader it is different from the rest of the text.

It is great to see that you have been proofreading your writing already! when yesterday we went to the pool.

First we walked from our school to the pool. Remember to always begin a new sentence with a capital

letter. Check all your sentences now. next we changed
into our swimmers and had a swim. after

that we had some lunsh When you get a red line
under your writing that means that the word isn't spelt
correctly. Have a good look at lunsh and think about the

spelling pattern at the end (hint: it's like 'crunch') and had
aanother swim. finaly we got changed into

our school clothes a walked backe Listen

Tracked
document

Teacher
feedback/
support
using
tracking
mode

Authentic assessment

Authentic context

Authentic task

Expert performance

Multiple views

Collaboration

Articulation

Reflection

Scaffolding

Authentic assessment

Assessment is integrated with the task rather than separate testing

Authentic assessment

- Seamless integration of assessment and task
- Opportunities to enable students to craft polished performances
- Significant student time and effort in collaboration with others



Authentic assessment

Technology tool

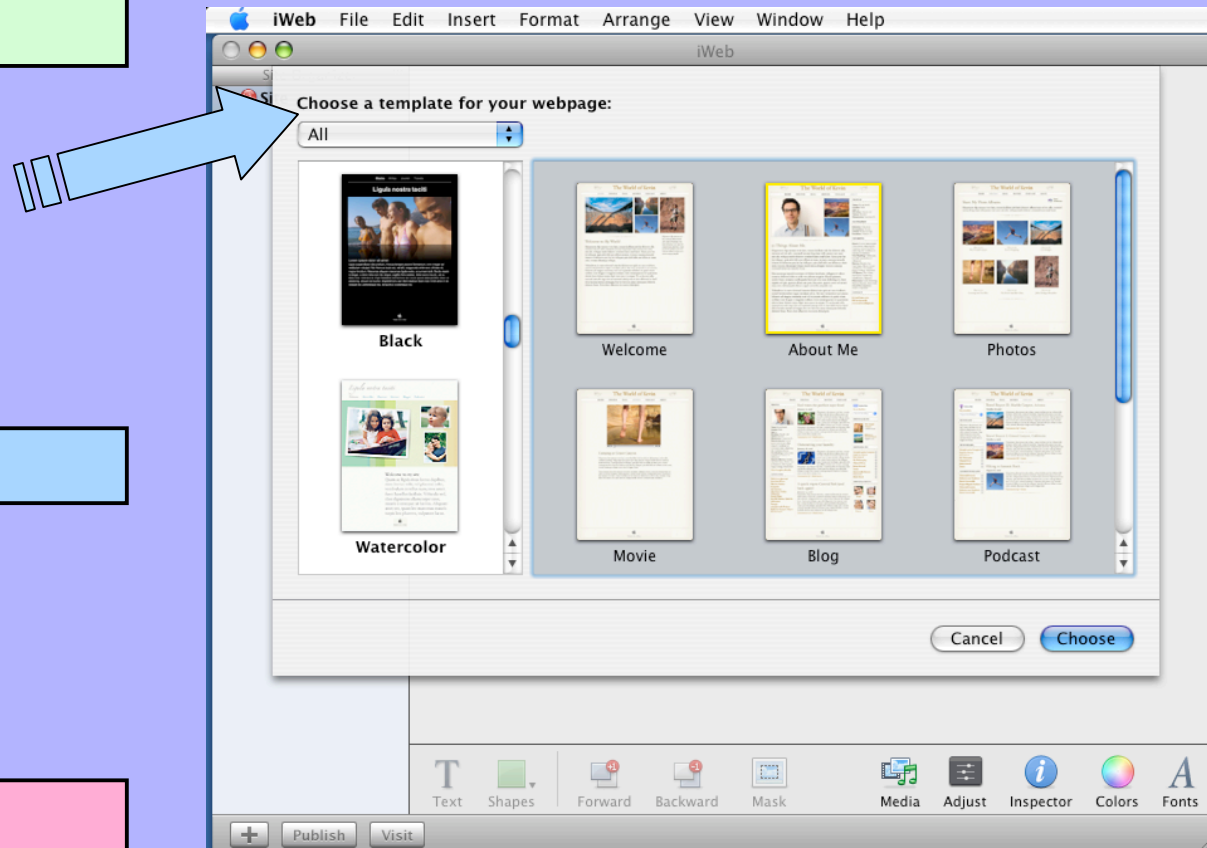
Online
portfolio

Target students

Upper primary,
secondary

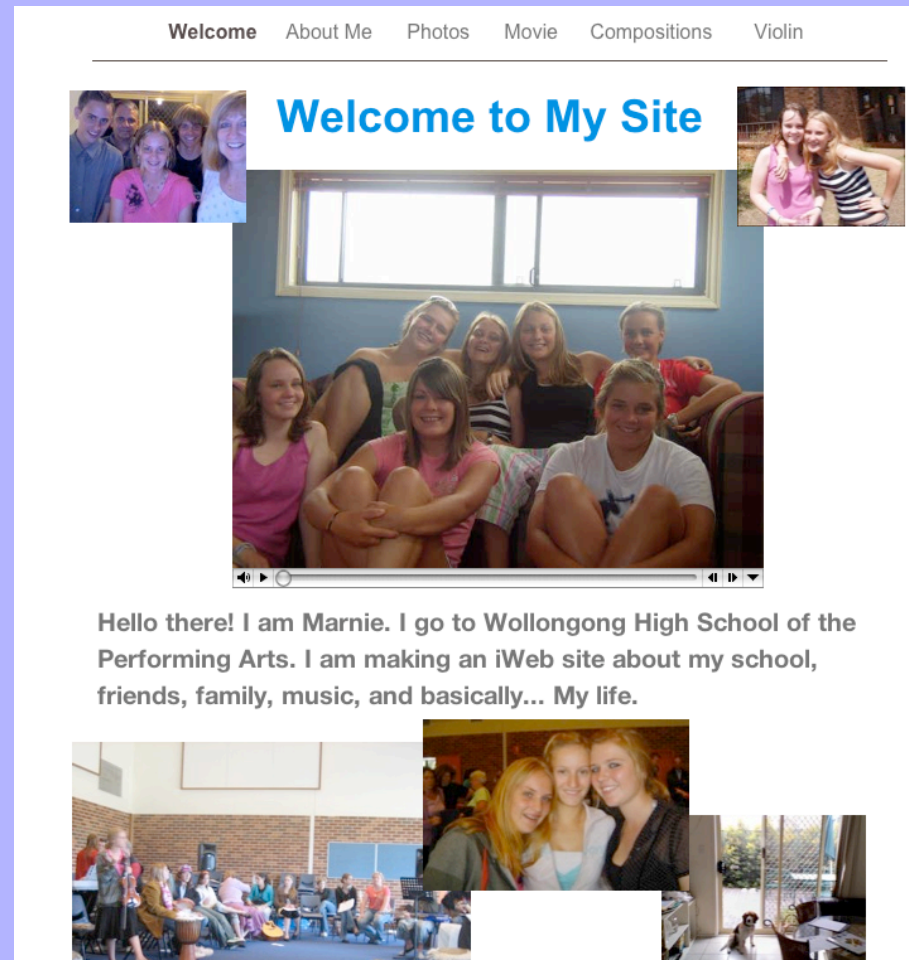
Subject area

Multi-disciplinary



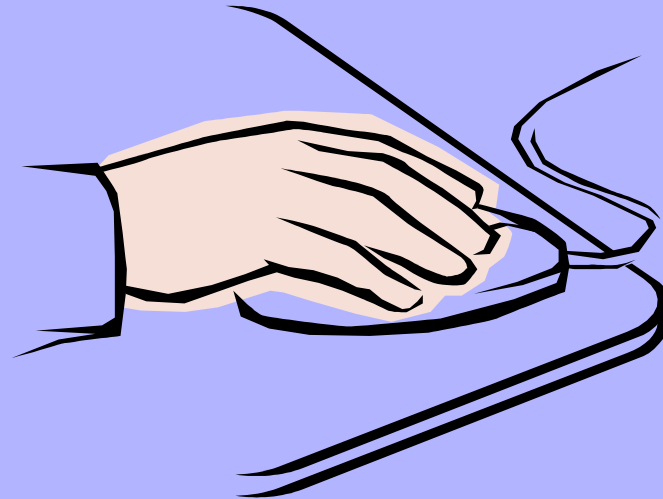
Authentic assessment

- [Student web portfolio](#)
- Web space for uploading a range of products such as:
 - Video
 - Sounds
 - Writing
 - Images



Role of technologies in these examples

- As rationale and context
- For information
- For scaffolding
- As cognitive tools



Technology in the hands of the student
(rather than the teacher)!

David Jonassen:

'Students cannot use [cognitive] tools without **thinking deeply about the content** that they are learning, and second, if they choose to use these tools to help them learn, the tools will **facilitate the learning process**'



Checklist for design

- ✓ Authentic context
- ✓ Authentic activity
- ✓ Expert performances
- ✓ Multiple perspectives
- ✓ Collaboration
- ✓ Reflection
- ✓ Articulation
- ✓ Coaching and scaffolding
- ✓ Authentic assessment

**Using
technology
as
cognitive
tools**

Thank you!


Downloadable papers, links to sites and resources

www.uow.edu.au/~janh/cebu/


With thanks to my co-researchers:
Ron Oliver, Tom Reeves and Tony Herrington

3rd National ICTs in Basic Education Congress

Website to accompany demonstration:
Authentic technology-supported learning activities
LINKS AND RESOURCES





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Faculty of Education
University of Wollongong
Email: janh@uow.edu.au
Info: [Website](#)






Abstract
Technologies can be used as powerful cognitive tools when they are used—not for information delivery—but as instruments used by students to solve complex problems. A common way to use technology in the classroom is to use it to deliver information or teach concepts and skills (learning from technology). Another is to teach particular technologies and their uses (learning about technology). Perhaps the most powerful use of technology in classrooms is where technologies are used as tools (learning with technology). In this demonstration, authentic activities will be demonstrated as a means to organise learning topics where students—as well as the teacher—can engage with technologies in innovative and effective ways. The strategies will draw on principles of authentic learning, and will be illustrated with examples and


Links to sites

-  [Authentic task website](#)
-  [Mobile learning site](#)

Research collaborators

-  [Ron Oliver Website](#)
-  [Tom Reeves Website](#)
-  [Tony Herrington Website](#)

Presentation

-  [pdf of slides](#)

Useful reading:

AVAILABLE for FULLTEXT DOWNLOAD:

[Herrington, J., & Kervin, L. \(2007\). Authentic learning supported by technology: 10 suggestions and cases of integration in classrooms. Educational Media International, 44\(3\), 219-236. \(Download paper - pdf\)](#)

[Herrington, J., & Oliver, R. \(2000\). An instructional design framework for authentic learning environments. Educational Technology Research and Development, 48\(3\), 23-48. \(Download paper - pdf\)](#)

Other articles and papers:

[Herrington, J. \(2006\). Authentic e-learning in higher education: Design principles for authentic learning environments and tasks. In T.C. Reeves & S. Yamashita \(Eds.\), Proceedings of World Conference on E-Learning in Corporate, Government, Healthcare, and Higher Education 2006 \(pp. 3164-3173\). Chesapeake, VA: AACE. \(Download paper - pdf\)](#)